THE ‘FRAGMENTUM CENSORINI’,

also known as the ‘Epitoma disciplinarum’,

translated by L.K.M. Maisel

from the text established by K. Sallmann[1]

[Incomplete in its current state, this work of unknown title and authorship gives an overview of important fields of ‘liberal’ education: chapter **1** gives a general cosmology of Stoic character, **2–3** concern the heavens and the earth, **4–8** geometry, **9–12** music, **13–15** poetic meters.]

1. ON THE CONSTITUTION OF NATURE

(1) The beginnings of things are called elements or principles. The Stoics believe these to be tension and matter. When matter rarefies, tension stretches from the midpoint to the outer ends, and when matter contracts again, it is brought back from the ends to the midpoint. Thales of Miletus said that water is the principle of all things, and I summarized the other opinions before [in a now lost section]. **(2)** The opinion of the Stoics is commendable, since they, when they had considered what an artfully composed work the world is, proposed that nature is provident and wise, as its unchangeable order showed, and declared that the world was created (*industriā factum*). **(3)** The world is either eternal or long-enduring, and it vanishes into flames and is in turn renewed and reconstituted out of flames, since the principles endure. And something that is both destroyed and regenerated by itself cannot dissolve into nothing. **(4)** It consists of four elements, earth, water, fire, air. Some, like Cleanthes, think that the sun is its ruling faculty (*principalem* = gr. *hêgemonikon*), whereas Chrysippus thinks that it is the ether, by whose eternal motion the things below it[2] are contained and governed, while ether itself is subject to nothing else. **(5)** The earth bringths forth all things from itself through the mixture of all things, and the well-ordered things are nourished, the disordered are destroyed. It is manifest that the elements move in reciprocal succession, and that the whole remains eternal through the destruction of the individual parts.

2. ON THE MAKEUP OF HEAVEN

(1) Heaven (*caelum*) is divided into five circles.[3] The two outermost ones, in the deepest south and highest north, are extremely cold. Next to both of these are two called parallel or equidistant, so to speak,[4] which are the same as the tropic or solstitial circles; one is the hibernal (winterly), and the winter solstice occurs when the Sun is passing through this region and enters the eighth

---

This is version 1.03 of the translation of the *Fragmentum Censorini*, published 15.02.2020.

[1] Censorini De die natali liber ad Q. Caerellium; accedit anonymi cuiusdam epitoma disciplinarum (Fragmentum Censorini), edidit Nicolaus [=Klaus] Sallmann, Leipzig 1983.

[2] Ether being the fiery outer part of the (spherical) cosmos. This sometimes includes everything from the fixed stars down to the moon, but here seems to mean the part beyond the (wandering) stars.

[3] As far as temperature goes, these are really climatic zones of the earth, but they are defined with reference to larger cosmological contexts. The word *caelum* can refer to the sky (everything above us), to weather, to the entire region between the Moon and the fixed stars, sometimes only to the outermost sphere containing the fixed stars, or to the cosmos as a whole.

[4] *paralleloe* is a Greek word (in Latin transliteration), *aeque distantes* a Latin translation of it.

degree of Capricorn; the other is the aestival (summerly), and the summer solstice occurs when the Sun is passing through it and enters the eighth degree of Cancer. **(2)** Between them is the equinoctial circle, where the eighth degree of Aries marks the vernal equinox, the eighth of Libra the autumnal.

The zones[5] of the earth have the same names as the circles of heaven. It is uninhabitable beneath the cold circles, on account of their harshness, since the Sun is at the greatest distance from them. The middle, equinoctial zone is also inhabitable, because it is directly beneath the path of the Sun. **(3)** However, the Gedrosians[6] and the greater part of Ethiopia[7] are thought to be situtated in this region, and so are most islands of the Red Sea and so are other extended and far regions of our country.[8] There is no doubt that the regions under the tropic circles are inhabitated. Ours is the aestival solstitial zone and it is high and elevated. **(4)** Separated from us by the equinoctial circle are the people called *antichthones*.[9] They seem to be down below – but on account of the curvature of the earth, this should not appear incredible. The *antichthones* are the same as the *antistoechoe* and *antiscioe*.[10]

The zodiac (*signifer*) does not reach from one outer circle to the other, but from the lower southern and winterly tropic through the equinoctial to the higher, aestival solstitial circle. It is extended diagonally through the middle longitude and latitude. **(5)** There are 360 degrees in the zodiacal circle (*circuli signiferi*). There are twelve signs, each of thirty degrees, of which some are called minor, some major and *pólōn anaphorá* (πόλων ἀναφορά, 'turning-points of the axes[?]'). To compensate (for this?), five more degrees are thought to be added, so that there are 365 degrees of the zodiac.[11] Beginning with Aries, the signs are alternately favorable to male or female natives.

(6) Every fourth[12] of them is either tropical or solid or bicorporeal. The count begins from Aries, which is a tropical sign. Two of the tropical signs are equinoctial – Aries and Liba –, and two are solstitial – Capricorn and Cancer. Those next to the tropical signs are solid signs, those after the latter bicorporeal signs.[13]

---

[5] The word *zonae* stands out as a Greek loanword in the Latin text.

[6] A coastal region (and semi-desert) in modern Iran and Pakistan.

[7] Ethiopia is not specifically the modern country but essentially all of (East) Africa south of Egypt, and sometimes, as perhaps here, (parts of) India as well.

[8] Literally, high places and promontories are named, but probably the furthest reaches of Roman rule are meant.

[9] Greek for "those (on the) opposite (side of the) earth".

[10] *Antistoechoe* and *antiscioe* ("[those who cast their] shadow [in the] opposite [direction]") are Greek words in Latin transliteration; an interpolation also adds the term antipodes ("[those whose] feet [point in the] opposite [direction]"), but these are all synonymous here. According to a one systematizing scheme, people in the same zone but opposite hemisphere are antoecians, those diagonally across in the other zone and other hemisphere are antipodeans, those in the other zone but same hemisphere are antichthones.

[11] The 365 days of the year are being reconciled with the 360 degrees of the zodiac – but how and why, I cannot follow exactly.

[12] Counting inclusively. By English count, every third sign.

[13] See 3.9 and footnotes.

3. ON THE FIXED AND WANDERING STARS[14]

(1) Of the stars, some are carried along with heaven,[15] and are called fixed because they do not leave their positions; others go against the direction of heaven and towards heavenrise,[16] but outmatched by the speed of the world,[17] they seem to set with it, although they still go through their own courses.

(2) The Sun burns as the greatest[18] star in the middle of the ether. It moves one degree (*singulas partes*) in the space of one day and one night, making the round of the zodiac (*signiferum*) in the space of one year. The Moon catches flame from the Sun, circles the earth most quickly – in the course of thirty days – and is so close and connected to the pole of the earth that it regularly moves into its shadow and loses its visibility. When it is under the sun[19] and blocks its rays, it effects a darkening which appears as an eclipse (*defectio*) of the sun. Sometimes it is "hollow" and goes through its course in fewer than thirty days.[20] **(3)** The star of Saturn[21] has the longest cycle to pass through, remaining in each sign for thirty months and passing through the entire zodiac over a period of thirty years. It is cold and infertile, unfruitful for lands, unsalutary to those who are born (under it), it causes adversities which are not sudden but protracted. The star of Jupiter remains in each sign for a year, and completes the zodiac in twelve years. It is salutary and temperate and favorable for all occurrences. **(4)** The star of Mars does not remain in the signs for equal amounts of time, but goes through the zodiac in about nine years. It is fiery and causes disorder both by adversities and by sudden deaths, either striking with unexpected diseases or killing by the sword. The stars of Mercury and Venus follow the sun and maintain the same places.[22] **(5)** The star of Mercury takes on a character like that of the planet which he sees.[23] That of Venus is generative (*genitalis*), moist, favorable and salutary.

The Moon is thought to have its own globe, but to receive its fire from the Sun; its brightness depends on how much it receives. When it moves away from the sun, it is strengthened; but when it is has taken a contrary position, a wholly opposite (force) hits it, and, like a mirror, it shows a mere image, and not full vigor.[24] When it is growing (*crescente*), all things subject to growth (*universa gignentia*) flourish, when it is fading (*tenuescente*), they are weakened. **(6)** All moisture and spirit[25] is invigorated, the Ocean swells, then sinks again as the moon's fulgor decreases. What is worn away from the changing heaven and the wandering stars in their coordinated cycles and regularly flows down, this the Moon draws up and transfers to the Sun; and it is through the Sun that living beings grow and the soil is, so to speak, animated with generative warmth.

---

[14] Wandering stars is a literal translation of the Greek word 'planet', which in antiquity usually referred to the now so-called five classical planets (Saturn, Jupiter, Mars, Mercury, Venus) as well as to the luminaries (Sun and Moon).

[15] I.e. with the motion of the outermost sphere.

[16] This is my translation for *ortus caeli*, by analogy to *ortus solis*, sunrise; the meaning is that the wandering stars move toward the direction which the outermost sphere is moving away from.

[17] Heaven/sky (*caelum*) and world (*mundus*) are often synonymous. The idea is that the earth is stationary, the outermost sphere of heaven moves in one direction and carries the wandering stars along with it, but the latter also slowly move in the other direction.

[18] Probably in the sense of 'brightest'.

[19] I.e. between the sun and the earth; under the sun in the sense that the earth is the lowest point and everything further out is above it.

[20] The *Fragmentum* is conflating the course of the moon, considered to be entirely regular in Greco-Roman astronomy, with the length of conventional months.

[21] "Star of Saturn" is the older form, later the planets were called by the names of the gods themselves (i.e. simply "Saturn"). The *Fragmentum*, like most sources of the Roman imperial period, varies both forms freely.

[22] I am uncertain how this is meant.

[23] I.e. is in trine aspect with; see 3.8.

[24] The Sun's light reflected by the moon is here treated as something very substantial: the lunar globe (i.e. the celestial body itself) is secondary to the solar flames caught by the Moon. If I understand the description of the waxing and waning of the Moon correctly, the idea is that during the waxing, something of the Sun's real fire is translated to the Moon, which reaches its greatest extent at the full Moon; during the waning, only an image of the Sun's brightness is reflected by the Moon. As elsewhere in the text, simplification has arguably been taken too far,

The planets[26] have power over beginnings when they are rising,[27] but are inert as they set.[28] **(7)** A planet rises when the Sun has passed it,[29] and reaches the morning station (*stationem matutinam*) when it is five signs' distance[30] from the sun. It remains in the same sign until/while it(?) is moved away from it by(?) the sun.[31] When it is in opposition (*contraria*) to the sun, it sets in the morning, rises once it is night, and is called *akrónykhos* (ἀκρόνυχος, 'of/at nightfall').[32] Then, when it has reached the fifth sign (from the sun) in the other direction, it reaches the afternoon station (*postmeridianam stationem*), until, as the Sun enters the same sign, it is its hidden by the Sun's rays and completely disappears.

(8) Planets see each other (*aspiciunt*)[33] at five signs' distance,[34] which is called Trine (τρίγωνον), and are in greatest harmony (*consensionem*).

Four signs' distance is called Square (τετράγωνον)[35] and has the greatest mutual effect.

---

but the dichotomy fits with the idea that the waxing Moon generally has a productive, the waning a destructive influence, as described in the next sentence.

[25] Not something incorporeal, but a subtle fiery air (warm like an animal's breath).

[26] The Latin speaks of stars, but it is specifically the planets that are meant.

[27] I.e. ascendant.

[28] In 3.7, the author is, it seems, mistakenly ascribing the peculiar motion of Saturn, Jupiter and Mars to all planets. Compare the following passage from Porphyry's *Introduction to Ptolemy's Tetrabiblos*: "Generally, the planets can be seen rising in the eastern part of the sky, presuming they do not fall within the area that is approximately fifteen degrees to either side of an exact conjunction to the sun. More specifically, Saturn, Jupiter, and Mars will be visible in the sky as they rise in the east, roughly 120 degrees [=trine=five signs counting incusively] distant from the sun, at which point these planets will make their first station, preparing to retrace their path. At this point, they will continue to move backwards as the sun travels through the sixth sign from them and eventually reaches an opposition to them. Throughout this time period when they are exactly opposite to the sun, the heavenly bodies will appear to rise in the sky at the beginning of the night, at the time of the sun's setting [ἀκρόνυχος]. From this point, the planets continue to move backwards until they approach another trine to the sun, at which point they will make their second station, and then finally are released and begin to advance forward. In that, at this point, Saturn, Jupiter, or Mars are no longer moving retrograde but are now moving forward, they continue to advance into the section of degrees that rise after the sun, and continue to set in the evening until the sun reaches a conjunction with them." (193.24–194.3; translation from Andrea L. Gehrz, Porphyry of Tyre. An Introduction to the Tetrabiblos, Moira Press) The similarities are so strong that the *Fragmentum* must be based on Porphyry or a Greek original essentially identical to this portion of Porphyry's text.

[29] Reading *praeteriit* instead of *praeterit*; but perhaps the change is unnecessary.

[30] See note 33.

[31] It seems to me that there is something wrong with the text here.

[32] *Akrónykhos* is not, as far as I can see, a technical term of astrology, but it is rare enough that a reader of Porphyry could have come to the conclusion that it was.

[33] In modern terminology, trine, square etc. are all "aspects", but the *Fragmentum* uses the term *aspicio* ('to behold, be in aspect') more narrowly; planets in opposition, e.g., cannot "see" each other, as the earth is between them.

[34] Counted inclusively. E.g. if Saturn is in Aries, by Latin count Aries is the first, Taurus the second, Gemini the third, Cancer the fourth and Leo the fifth sign; if Jupiter is in Leo, they are in trine; if Venus is in Sagittarius, Saturn and Venus are also in trine. Counted exclusively, Saturn and Jupiter are either four signs apart (not counting Aries) or three signs apart (without counting Aries or Leo).

[35] An interpolation adds: "and is (also) called *centron*".

In Opposition, which is at seven signs' distance and called *diámetron* (διάμετρον), there is the greatest contrariety.

Other positions are either at variance or in minor aspect, like every three signs' distance, which is called Sextile.

(9) The tropical signs[36] have power over journeys and anything mobile, and they bring about sudden changes and alterations in one's plans.

The bicorporeal signs[37] signify the repetition of all things and sometimes delay.

The solid signs[38] take effect quickly and with force, bringing both favorable and adverse things to completion, depending on whether they are in aspect with favorable or hostile planets.

(10) Much depends on the house of a given star, whether it is its own or another's. The Sun's house is Leo, the Moon's Cancer, Mercury's Virgo and Gemini, Venus's Libra and Taurus, Mars' Scorpio and Aries, Jupiter's Sagittarius and Piscis,[39] Saturn's Capricorn and Aquarius. The Moon, Mars and Venus are favorable to nocturnal beginnings, the Sun, Saturn and Jupiter are more powerful during the day, and Mercury is variable, depending on harmony and aspect (*quomodo consensit aut visus est*).

4. ON THE EARTH

(1) The earth is the midpoint of all things; its shape is spherical. It is surrounded by water, it juts out into the air, it excludes (?) heaven. As it receives all water and the temperateness of the air, so it sustains, governs and moves all things.

(2) The book might seem to have reached its end here, having covered all things. But since both the dimensions of the world and much else beside among the range of things contain geometric proportions, let us say a few things about numbers and measurements.[40]

5. ON GEOMETRY

(1) Geometry is the knowledge (*scientia*) of constructing shapes and measuring their numbers along with their solutions (?). A number is a set of units (*congregatio singulorum*), always finite but infinite by nature.[41]

---

[36] Latin *tropica*, Greek *tropiká* (τροπικά): Aries, Cancer, Libra, Capricorn.

[37] Latin *biformia*, Greek *dísōma* (δίσωμα): Gemini, Virgo, Sagittarius, Pisces.

[38] Latin *solida*, Greek *stereá* (στερεά): Taurus, Leo, Scorpio, Aquarius.

[39] The *Fragmentum* uses the singular, rather than the plural *Pisces*.

[40] It seems clear that "all things" should refer to more than the extant first four chapters, especially since the "few things" about numbers and measurements are longer than them. But I would think that from this point, the work is complete, unless a section on arithmetic is missing. But geometry was more prominent than arithmetic for much of antiquity, and arithmetic came to greater prominence especially when it was picked up by the Platonists – but the present work is clearly in Stoic in outlook, as the first chapter shows.

[41] This is my attempt to render *finita semper et infinita natura*. As I understand it, this is a deliberately paradoxical statement with the meaning that any one number is finite, yet there are infinite numbers.

6. ON FORMS[42]

(1) [1] A point (*nota*) is what has no parts.

[2] A line is a length without breadth.

[3] The endpoints of a line are points.

[4] A straight line is a line that lies evenly with the points on itself.

[5] A surface is what has only length and breadth.

(2) [6] Lines are the ends of a surface.

[7] A plane, which is called *epipedos* (in Greek), is a surface that lies evenly with the straight lines on itself, or that lies evenly with its edges.

[8] A plane angle is the inclination of two lines in a plane surface (*in planitie*) that are not exact opposites[43] and meet in a single point (*unum signum*).

[9] When the lines which contain the angle are straight, the angle itself is said to contain straight lines.

(3) [10] If a straight line is set up on another straight line in such a way that the adjacent angles are equal to one another, then both of the equal angles are called a right angle, and the line is called *káthetos* (κάθετος, 'perpendicular') in Greek and *normalis* in Latin. The right angle is equiproportional.

[11] An obtuse (*hebes*) angle is greater than a right angle.

[12] An acute angle is less than a right angle.

7. ON SHAPES[44]

(1) [14] A shape (*figura*) is what is contained by any boundary (*fine*) or boundaries.

[15] A circle is a plane shape contained by one line, called the arc *(circuitus*); all lines from the middle to the arc are equal to each other.

[16] The center (*centron*) is the point in the middle of the circle.

(2) [17] The diameter (*diametron*) is a straight line drawn through the center and intersecting the circle on both sides.

[18] A semicircle (*hemicyclium*) is half a circle.

---

[42] A translation of the first twelve definitions in book one of Euclid's *Elements*, as indicated by the numbers in square brackets.

[43] I.e. they must not run in exactly the same direction, like a line from 0x0y and another from 2x2y meeting in a point at 1x1y – which would make them essentially one line, not two lines that meet at an angle.

[44] Euclid's 13th definition is omitted ("A boundary is that which is an extremity of anything."), the text continues with definition 14.

[19] Rectilinear shapes[45] are those contained by sraight lines (*rectis lineis*).

A triangle (trigonum) is what has three sides (*trilaterum*), a quadrilateral (*tetragon*) what has four, a multilateral what has more.

(3) [20] An equilateral triangle is one that has three equal sides, an isosceles has only two equal sides, a scalene (*scalenon*) has three unequal sides.

[21] An orthogon (*orthogonium*, 'right-angled') is a triangle that has a right angle, an amblygon (*amblygonium*, 'obtuse-angled') one that has an obtuse angle, an oxygon (*oxygonium*, 'acute-angled') one whose three angles are all acute.

(4) [22] Of quadrilateral shapes, the square (*quadratum*) has four equal sides and all right angles; the oblong (*heteromeces*) has right angles but not all equal sides; the *scutula*, that is a rhombus (*rombos*), has equal sides but not right angles; the rhomboid (*simile scutulae*) is neither equilateral nor right-angled but its opposite sides and opposite angles are equal, respectively. Other (quadrilaterals) are called trapezia.

(5) [23] Parallel (*paralleloe*) lines are (straight lines) which, though lying in the same plane (planitie), never meet.

8. ON POSTULATES[46]

(1) The postulates of the geometers are five:

[1] That it shall be possible to draw a straight line from any point to any other point (*signum*).

[2] (And possible) to make any finite straight line continue in the same direction.

[3] (And possible) to create a circle around any point (*medio*) with any radius (*intervallo*).

[4] And all right angles shall be equal to each other.

[5] And, if a straight line intersecting two straight lines should make the interior angles less than two right angles, the lines will meet if they continue (in that direction).

(2)[47] [2] If equals are added to equals, the wholes (*omnia*) shall be equal.

[3] And the same if equals are subtracted from equals.

[1] And when things are equal to the same things, they are also equal to each other.

---

[45] Here the *Fragmentum* curiously switches back from *figura* to *forma*, and the Greek *euthygrammoe* rather than a Latin translation as before (perhaps because it was felt that the phrase 'straight line', *recta linea*, could not be made into a compound adjective).

[46] The postulates follow directly after the definitions in Euclid. Chapters 6–8 are essentially complete and mostly literal translations of the Euclidean definitions and postulates.

[47] Chapter 8.2 gives the first three of five "common notions", in a different order than in the received Greek text. After two further common notions ("Things which coincide with one another are equal to one another" and "The whole is greater than the part"), the propositions, which make up the rest of book 1 and the subsequent 12 books, begin.

9. ON MUSIC

(1) Music is older than the invention of metrics. The earliest poets were Homer, Hesiod and Pisander, and the elegiac poets Callinus, Mimnermus and Evenus followed them.[48] Soon Archilochus and Simonides invented the iambic trimeter and the choric tetrameter catalectic. **(2)** Archilochus also varied the verses by adding parts (to their meters), and rather divided them out into many types, whereas Alcman shortened the meters in song. Next, there was melic poetry. Telesilla of Argos brought shorter meters into circulation. This kind, although it was already displeasing and seemed to be shorter than a whole, was strengthened by the standing of Pindar, who also made use of meters free of real order. The *musici* Timotheus, Polyidus, Hyperides and Phyllis followed them, as did Aristoxenus, very famous both for his expertise and his eloquence. From this moment, songs were well-ordered. **(3)** But do not think that the most ancient songs were composed without any meters; but they were rough and unsophisticated, and the poetic art later improved them, like a more fitting[49] and measured, correct musical art.

10. ON THE WORD RHYTHM

(1) Rhythm is believed to be named after Rhythmonius, the son of Orpheus and Idomena, an Ismarian nymph, as Nicocrates records in the book he wrote *About Music*. He records that the brother of Rhythmonus was Hymenes; and the son of Rhythmonius and Chloris, daughter of Tiresias, was Periclymenus,[50] who first sang the deeds of heroes in musical songs.

11. ON MUSIC

(1) Music is expertise in the composition and singing of melodies (*modorum*). It can be divided into harmonics (*harmonica*), *organica*, *rhythmica* and *crusmatica*:[51] beautiful notes without song are called *crusmata*, **(2)** harmony is consonance, *organica* is [...][52], and rhythm is so called in Greek[53] because it “flows” and goes in a circle around itself.[54]

---

[48] In the sense that the elegiac meter is based on heroic hexameter. The elegiac poets are later than the early epic poets named first, but also significantly later than Archilochus and Simonides.

[49] Reading *decentior* rather than *licentior*.

[50] An interpolation adds: “and Peridemes”.

[51] There does not seem to be an exact parallel to this subdivision in the extant Greek literature on music. Martianus Capella (*Philologia* 9.936) subdivides music as follows:

1. the material part (*hylikón*), concerning tone (*sonum*), ‘numbers’ and words
    1.1 **harmonics** (***harmonica***) dealing with melody (*melos*)
    1.2 **rhythmics** (***rhythmica***) dealing with ‘numbers’ or musical measure
    1.3 metrics, dealing with words
2. the practical part (*apergastikón*), concerning the composition of 2.1 melodies, 2.2 rhythms, 2.3 lyrics
3. the interpretatory (*exangeltikón*) or hermeneutical part (*hermēneutikón*)
    3.1 the **instrumental part** (***organikón***)
    3.2 the vocal part (*ōidikón*)
    3.3 the performative part (*hypokritikón*)

[52] The definition is lost, but Greek *órganon* means ‘instrument’. Is “organics” the use of instruments for accompaniment?

[53] An interpolation adds: “and *modus* in Latin”.

[54] In other words, it is repetitive. Greek *rhýsis* is ‘flow’, *rhýthmos* is cognate.

Further, ‘mode’ (*modus*) is a sort of law of the intervals and distinctions of sounds, or, by Aristoxenus’ definition, a wholly uncompounded temporal interval of sounds.[55]

(3) Song[56] (*carmen*) is ‘mode’ joined with speech, and its subordinate parts are singing, ‘mode’ and movement.[57]

[...]

A mora (*tempus*) is the unit of measurement for syllables, its element being a short syllable.

By a different division, (metres are divided into) rational and irrational,[58] according as their proportions are (?).

12. ON THE ‘MODES’

(1) Modulation[59] is the careful arrangement of ‘modes’.[60] It has three kinds, namely diatonic, chromatic and enharmonic.

There are thirteen kinds of notes (*carminum*),[61] of which the primary are the Dorian, Phrygian and Lydian. **(2)** With certain additions to these, there are the Hypodorian, which is the lowest; two Hypophrygians, the Lower and the Higher; then as many Hypolydians and again one Lower and one Higher; then the Dorian in the middle; threafter the Low Phrygian and another, elevated Phrygian; as many Lydians, Low and High; then the Mixolydians, divided in the same fashion, finally the Hypermixolydian, which is the highest.

---

[55] The Latin is *non utcumque conpositum vocalium temporum intervallum*. It may be translated from τόνος δέ ἐστι τόπος τις τῆς φωνῆς δεκτικὸς συστήματος ἀπλατής (Cleonides 180.5), ‘tone is a range of sound without breadth capable of being compounded’. This is not found in Aristoxenus’ extant works but is attributed to him by Porphyry (λέγεται δὲ τόνος καὶ ὁ κατὰ τὸ σύστημα τόπος κατ’ Ἀριστόξενον δεκτικὸς ὢν τελείου συστήματος ἀπλατής, *On Ptolem’s Harmonics* 82.3–5). See Andrew Barker, *Porphyry’s Commentary on Ptolemy’s Harmonics* (2015), p. 259 with footnote 321, and Andrew Barker (ed.), Greek Musical Writings, vol. 2, Harmonic and Acoustic Theory (), p. 421 with foonote 117.

[56] Or ‘note’, as below (12.1–12.2)?

[57] The Latin is *cantus*, *modus*, *motus* – as much else in the sections on music, rather too general and abbreviated to carry much meaning. Perhaps (but perhaps not) something like the following threefold division from Martianus is meant: “motion (*motum*) of the body; proper regulation of sounds and melody (*modulandi*); and words (*verba*) which are grouped by suitable proportions into measures (*modis*); these three, when combined, produce a perfect song (*cantilenam*)” (*Philologia* 9.969, translation adapted from Stahl et al.).

[58] Martianus defines the irrational (*alogi*) meters or metrical feet as those which have no set proportion (*ratio*) but rather produce “an ill-formed combination” (Stahl translation; *Philologia* 9.975). The rational (*logii*), analogously, are proportional and produce well-formed combinations. For concrete examples, see Martianus *Philologia* 9.992.

[59] This refers specifically to the tuning of the tetrachord lyre. The *Fragmentum* has *diátonos*, *khrôma* and *harmonía* (διάτονος, χρῶμα, ἁρμονία), and Martianus Capella (*Philologia* 9.955) similarly has *harmonía*, *khrôma*, *diátonon*, but the usual word in Greek is *en*harmonic, not harmonic.

[60] Martianus calls them *genera* rather than *modi*. Genus seems to be the more established word in English for this sense, too.

[61] F = Hypermixolydian
E = High Mixolydian
E♭ = Low Mixolydian
D = High Lydian
C = High Phrygian
C♯ = Low Lydian
B = Low Phrygian
B♭ = Dorian
A = High Hypolydian
G♯ = Low Hypolydian
G = High Hypophrygian
F♯ = Low Hypophrygian
F = Hypodorian

(3) The lyre[62] used to have three strings, an upper, a middle, and a bottom one. This is why the Muses too used to be counted as three: Hypate ('Uppermost'), Mese ('Middle'), Nete ('Bottommost').[63] Nowadays, they are distinguished into a greater number of tones,[64] namely[65]

> the *proslambanomenos* [added tone],
>
> the *hypate hypaton*, then the *parypate hypaton*, then the *lichanos hypaton*,
> [the lowest, second-lowest and forefinger-tone[66] of the lowest tetrachord]
>
> then the *hypate meson*, then the *parypate meson*, then the *lichanos meson*,
> [the lowest, second-lowest and forefinger-tone of the middle tetrachord]
>
> then the *mese*, [middle tone]
>
> then the *trite synemmenon*, [third tone of the disjunct tetrachord]
>
> the *paramese*, [tone next to the middle tone]
>
> the *trite diezeugmenon*, [third tone of the conjunct tetrachord]
>
> the *nete synnemmeon*, [highest tone of the conjunct tetrachord]
>
> the *paranete diezeugmenon*, the *nete diezeugmenon*,
> [second-highest and highest tone of the disjunct tetrachord]
>
> the *trite hyperbolaeon*, [third tone of the highest tetrachord]
>
> ...[67]

Tradition holds that Apollo discovered the pleasant sound of a string in his bow and thereafter invented the cithara; he then noticed that a more tightly strung sinew produced a higher sound, while a more loosely strung one gave a lower one, and so he made the three original strings which were mentioned above. Lycorus, who some say was the son of Apollo and the nymph Parnasia,[68] received the string(ed instrument) and left it to Chrysothemis. He[69] invented the conjunct tetrachord (*adiunctum modum*) which is called the *synemmenos*. Terpander increased the number again by the addition of the disjunct tetrachord (*diezeugmenu*), which is turned from low sounds to high. Later, Timotheus added two more, the next-to-middle (*paramesen*) and the highest tetrachord (*hyperbolaeon*).

---

[62] The Latinized Greek word *organum*, 'instrument', is used, but what is meant is an early, relatively simple stringed instrument.

[63] These are Greek terms/names, for highest, middle, and lowest. Unfortunately, their meaning is reversed from the sense of high (high-pitched) and low (deep) which was used in the previous paragraph and which is now common in English, so I have used more strongly spatial terms here.

[64] The *Fragmentum* has soni (usually 'sounds'), Martianus Capella (*Philologia* 9.931) speaks of 18 'tropes' of the tones (called both *toni* and *soni*).

[65] The *Fragmentum* simply lists the Greek terms in Latin transliteration; Martianus (*Philologia* 9.931) gives Greek names in the original script and Latin translations, but he gives slightly different Greek terminology and a different order. To avoid even further confusion, I will not adduce this, but add explanations (cast in terms of high and low pitch, not upper and lower strings) based on those in the English translation of Martianus Capella (*The marriage of Philology and Mercury*, translated by William Harris Stahl and R. Johnson, with E. L. Burge, 1977).

[66] I.e. the one struck with the index finger stretched out, apparently higher than the second-lowest.

[67] A second-highest and highest tone of the highest tetrachord are missing, and (on analogy with Martianus at least) so is a second-highest of the conjunct tetrachord.

[68] Hyginus names Lycorus only as a son of Apollo "from a nymph", and the only other mention I know of is Pausanias (10.6), who treats Parnassus, son of Apollo and Parnassia, and Lycorus, son of Apollo and Corycia, as separate figures. However, they both figure in stories meant to explain the name of the city Lycoria, so the conflation here is not surprising.

[69] So the *Fragmentum*; but as far as I can tell, Chrysothemis was an exclusively feminine name, making this either an exception or an error.

(5) The smallest part of a 'mode' is called a *diesis,*[70] half of one is called a half-tone (*semitonium*), an entire 'mode' is called a tone (*tonos*). (An interval/consonance of) two and a half tones is called *diatesseron,* three and a half *diapente,* six *diapason.*

These are the most imporant facts about music.

13. ON METERS, I.E. *NUMERI*[71]

(1) They are called *metra* in Greek, *numeri* ('numbers') in Latin. Meter is the established mode of ordering equivalent feet. The parts that make it up are whole feet, and their parts are syllables, which are the elements of meters. The elements of their measures are the extensions and moras[72] of syllables. **(2)** Feet are made up of at least two, at most three syllables; they begin at two moras (*tempora*) and go up to six. There are four disyllabic feet, eight trisyllabic ones. There cannot be more than these twelve.

> The pyrrich is made up of two short syllables, e.g. *Cătŏ.*
>
> Iamb, one short and one long, e.g. *sălūs.*
>
> Choree [= trochee], one long and one short, e.g. *Rōmă.*
>
> Spondee, two long, e.g. *vātēs.*

(3) So there are two of opposite quantity, the spondee and the pyrrich. One [=pyrrich] consists of two moras, the other of four. Two are of the same order, both of which consist of three moras, the iamb and the choree. There are no more than these four feet, nor can there be.

> **(4)** The first of the trisyllables is the dactyl, which consists of one long and two short, e.g. *Hannĭbăl.*
>
> The anapaest, on the contrary, of two short and one long, e.g. *Căpăneus.*
>
> Amphibrach, short and long and short, e.g. *ăvārŭs.*
>
> Brachysyllabus [=tribrach], three short, e.g. *Cĭcĕrŏ.*
>
> Contrary to it, the molossus, three long, e.g. *Maecēnās.*
>
> Then, three with five moras:
>
> Bacchius, two long and one short, e.g. *Lātōnă.*
>
> Of the same order but opposite, the palinbacchius [=antibacchius], one short and two long, e.g. *Ăquīnās.*

---

[70] Martianus (*Philologia* 9.931) distinguishes three intervals that can be called a diesis, the smallest being a quarter tone.

[71] In this and the following chapters, vowels in Latin quotations are either marked as short (e.g. ă) or as long (e.g. ā); if they are left unmarked, they are long by position (i.e. they are followed by more than one consonant) and thus their actual length is irrelevant to ancient metrics. The commentary mostly accepts the *Fragmentum*'s system, rather than presuming to correct it.

[72] A short syllable has one mora, a long syllable has two moras.

Cretic, (also called amphimacer,) long and short and long, e.g. *sānitās*.

(6) So there are two of contrary quantity, brachysyllabus and molossus, of which one has three moras, the other six; and three each with four and five moras, respectively.

14. ON THE ESTABLISHED METERS

(1) The first and most established meter is the heroic hexameter. Its feet are either dactyls or spondees; rarely, a trochee can be found in the final position. An example ⟨Lucretius 1.926⟩:

Āvĭă Pīĕrĭdum pĕrăgrō lŏcă nullĭŭs antĕ.

This one is entirely dactylic, and then has a final trochee. But this one is mixed with spondees ⟨Vergil, *Aeneid* 1.2⟩:

(2) *Ītălĭam fātō prŏfŭgus Lāvīniăquĕ vēnĭt;*[73]

Entirely made up of spondees ⟨Ennius⟩:

Cīves Rōmānī tunc factī sunt Campānī.

This type of meter has at least twelve syllables, at most eighteen. It takes twenty-four moras, but can sometimes be made with only twenty-three. It can take thirty-two different forms, which would be too long to enumerate for hurried readers.

(3) This is an example of elegiac pentameter ⟨Tibullus 1.1.6⟩:

Dum mĕŭs adsĭdŭō lūcĕăt ignĕ fŏcŭs.

It takes (two) dactyl(s), a spondee, and then two anapaeasts, but sometimes a brachysyllabus at the end. It comes to at least twelve syllables, at most fourteen. The third foot always has a spondee, the fourth and fifth are anapaeasts, the fifth sometimes a brachysyllabus.

(4) The iambic trimeter is called senarius[74] in Latin. This is an example ⟨Catullus 4.1⟩:

Phăsēlŭs istĕ, quem vĭdētĭs, hospĭtēs.

This has twelve syllables. Sometimes it takes a final pyrrich after the iambs in the other positions.

The tragic trimeter ⟨Accius⟩:

Prō vestĕ pinnis membră textis contĕgĭt,

And ⟨Accius⟩:

Ăquĭlōnis strīdor gĕlĭdas mōlītur nivēs.

It takes a spondee in the first part of its course, or a dactyl or an anapaest in its place; and in place of an iamb, a choree or a tribrach. It comes to at least twelve syllables, and to seventeen at the most. It takes at most twenty-three moras, at least eighteen. **(5)** The comic trimeter tends to make more resolutions into short syllables.

---

[73] The second *i* in *Lavinia* is pronounced as a consonant (“Lavinya”).

[74] The Greek name trimeter (from the word for three) is equivalent to Latin senarius (from the word for six) because it consists of six individual feet, but three dimetra or syzygies (pairs) of feet.

The Hipponactian trimeter, which makes the last foot into a spondee or choree, goes like this:

> *Călentĭbusquĕ lymphă fontĭbus sempĕr*.

It takes all the same feet as the others, except for the last one.

(6) The choriac tetrameter, which is called a quadratus in Latin,[75] is like the following:

> *Tĕlă fămŭlī, tĕlă prŏpĕrē, tĕlă; sĕquĭtur mē Thŏās*.[76]

It takes the same feet, and it goes up to seven and a half feet.[77] As the last foot[78] it accepts either a cretic or a dactyl.

The iambic octonarius ⟨Accius?⟩:[79]

> *Proin dēmĕt abs tē rĕgĭmĕn Argos, dum est pŏtestas consĭlī*.[80]

(7) The septenarius:[81]

> *Haec, bellĭcōsus cui păter, māter clŭet Mĭnervă*.[82]

It consists of the same feet.

(8) The Ionic septenarius ⟨Ennius⟩:

> *Ībant mălăcī vĭērĕ Vĕnĕrĭam cŏrōnăm*.[83]

The Ionicus a maiore ⟨Ennius⟩:

> *Īlle ictus rĕtrō reccĭdĭt in nătem sŭpīnŭs*.[84]

This line has a fault in the third syllable.

The Ionicus a minore ⟨Horace *Odes* 3.12.3⟩:[85]

> *Mĕtŭentis pătrŭae verbĕră linguae*.

---

[75] Quadratus translates only the word tetrameter, not choriac tetrameter in particular. This translation goes by the Greek count of dimetra rather than the count of individual feet, as the Latin names usually do.

[76] Tribrach + iamb repeated thrice, then a creticus (or a choree and a half-foot).

[77] In other words, it is a catalectic tetrameter (one syllable short), as is the iambic octonarius.

[78] (trysyllabic) "last foot" = seventh (disyllabic) foot and the subsequent half-foot.

[79] The octonarius is equivalent to a tetrameter in that it is made of up eight individual feet arranged in four dimetra.

[80] The line divides as *pro͡inde* (spondee) *metabs* (iamb) *teregi* (dactyl) *menar* (iamb) *gosd'est* (spondee) *potes* (iamb) *tascon* (spondee) *sili* (iamb).

[81] The septenarius is made up of seven individual feet and a half foot. In technical terms, it is a tetrameter catalectic (four syzygies short one syllable).

[82] The line divides: *haecbel* (spondee) *lico* (iamb) *suscui* (spondee) *pater* (iamb) *mater* (spondee) *cluet miner* (two iambs) *va* (final syllable). The last individual foot is usually a choree/trochee (hence trochaic septenarius).

[83] Seven individual feet, beginning with two long and two short: ibant (spondee) mala (pyrrich) civi ere (two chorees) veneri (brachysyllabus) amco ronam (two chorees).

[84] As I understand it, this is supposed to represent the sequence of first two long; then two short two long, repeated thrice. But the line as it stands now does not exactly line up with this.

[85] Two short and two long, repeated thrice.

They mostly take pyrrichs and spondees, and tend to admit feet of more syllables as long as(?) the long syllables are separated.

(9) The Aristophanian anapaestic meter ⟨Pacuvius?⟩:[86]

Axĕnă Pontī per frĕtă Colchos dēnĭquĕ dēlātŭs ădhaesī.[87]

It always takes feet of four moras, and fills seven and a half feet.

The anapaestic Octonarius ⟨Pacuvius?⟩:

Ortĕ bĕātō lūmĭnĕ, vŏlĭtans quī per caelum candĭdŭs ēquĭtās.

It takes the same feet, except for the half-foot.[88]

The Aristobolian meter:

Quae tam terribĭlĭs tŭă pectŏră turbat, terrĭfĭcō sŏnĭtu inpŭlĭt?

This is a circuit more than a single verse.[89] It has many dactyls, few spondees.

(10) The duodenarian Paeon:

Quis mĕum nōmĭnāns nōmĕn aede excĭet? Quis tŭmultu invŏcans incŏlārum fĭdĕm?

This is also a circuit[90] more than a verse.

To this let the denarius be added:

[*corrupt verse*]

They take cretics, chorees, spondees, brachysyllabi, iambs and anapaests as their feet.

(11) The Phalaecian of eleven syllables ⟨Catullus 2.1⟩:

Passer dēlĭcĭae mĕae pŭellae.

It takes the spondee, dactyl, cretic and palinbacchium (in this order) as its feet.[91]

(12) The Angelic[92] meter removes one syllable from the hexameter, e.g. ⟨Vergil *Aeneid* 3.319⟩:[93]

Hectŏrĭs Andrŏmăchā, Pyrrin cōnūbĭă servās?

---

[86] Defined by Servius as an anapaestic tetrameter catalectic (seven anapaests and one syllable).

[87] This divides as *axena ponti perfreta colchos denique dela tusadhae si*.

[88] In other words, a full foot for the Aristophian's half-foot (?).

[89] I.e. it is more like two lines of a stanza: spondee and three dactyls, twice. Or perhaps the mere repetition of dactyls is meant.

[90] Eight cretics. (Or, since *aede* is a conjecture, three cretics, a choree, four cretics.)

[91] This line of Catullus can be analyzed as the sequence laid out here, but the first two syllables of a Phalaecian can alternately be a choree or an iamb.

[92] Angelic in the original Greek sense of messenger, not angel. The line is shorter than the heroic hexameter to express the urgency of a messenger relaying important news.

[93] This is, in fact, a complete hexameter. We know from the grammarian Diomedes that the syllable which is missing is the last one, so presumably the author of the Fragmentum replaced the final word with a monosyllabic one, but then a later copyist "corrected" this.

(13) The Anacreontian:[94]

Miseri invīdī scĭentēs.

It can take (any of) the pyrrich, choree, spondee, brachysyllabus and anapaest. The first is always a pyrrich.

(14) The Saturnian meter:

Magnum nŭmĕrum trĭumphăt hostĭbus dēvictīs.

Some also call this meter Aristobolian. It can take (any of) the spondee, iamb, pyrrich, choree, dactyl, brachysllable and anapaest.[95]

[15] Priapeus ⟨Catullus (fragment)⟩:

Hunc lūcum tĭbĭ dēdĭcō consēcrōquĕ Prĭāpĕ.

It has a cretic instead of a dactyl as its third foot; in other respects it is a (heroic) hexameter.

15. ON SIMPLE METERS

(1)[96] The Pyrrichian:[97]

Răpĭtĕ, ăgĭtĕ, rŭĭtĕ cĕlĕrĭpĕdēs.

Its contrary is the the dodecasyllabic Spondiazon ⟨Ennius⟩:[98]

Ollī crātēris ex aurātīs hausērunt.

The Dactylian ⟨Vergil *Aeneid* 8.596⟩:[99]

Pulvĕrŭlentă pŭtrem sŏnĭtū quătĭt ungŭlă campum.

The amphibrach does not constitute its own meter.

The Anapaestian:[100]

Ăgĭlis sŏnĭpes răpĭtur cĕlĕrī sŏnĭtū trĕpĭdans.

The Cretic:[101]

Horrĭdī transĕunt ad pĕdēs ex ĕquīs.

---

[94] This would correspond to the Anacreontian meter defined as an acatalectic Ionic dimeter a minore, i.e. in the Fragmentum's terms, its basic form is pyrrich, spondee, pyrrich, sponde. Here the third foot is a choree.

[95] This highly unspecific description gives no real idea of what makes the exemplary verse specifically Saturnian. This is hardly surprising, as the nature of the Saturnian verse is still debated today.

[96] In Latin, these meters are called by the same name as the feet they are made up of, but English words cannot move as freely between being nouns and adjectives.

[97] Four brachysyllabi and one iamb.

[98] Six spondees.

[99] An ordinary heroic hexameter, not a purely dactylic one. The first word in Vergil is *quadripedante*.

[100] Six anapaests.

[101] Four cretics.

The Palinbacchian:

Ămīcōs ăd hanc rem, sĭ vōlēs, ădvōcā.[102]

The bacchius does not constitute its own meter.

The Molossian is the same as the spondiazon.

(2) Now I will show how many meters can be derived from the heroic meter as a starting-point. And first, a heroic spondiazon shall become a trimeter:

Cīves Rōmānī tunc factī sunt Campānī.

I shorten one syllable, the penultimate, so that it is:[103]

Cīves Rōmānī tunc factī sunt Āpŭlī,

and it begins to be a trimeter.

If I take a heroic verse’s first part twice, it will become an elegiac verse:

Bellă pĕr Ēmăthĭōs | bellă pĕr Ēmăthĭōs.[104]

And, in the opposite direction, in order to make heroic lines starting from pentameter, I take the latter part:

Dum mĕŭs adsĭdŭō lūcĕăt ignĕ fŏcŭs,

and combine it:

Lūcĕăt ignĕ fŏcŭs | Troiae quī prīmŭs ăb ōrīs.[105]

(3) Taking a Phalaecian line, e.g.:

Altis flūmĭnă vallĭbus tŭmescunt.

With some words inserted I will create a heroic line from it:

Altis flūmina prōdĭtă vallĭbŭs indĕ tŭmescunt.

The following is an Ionicus:

Mĕtŭentis pătrŭae verbĕră linguae.

I will add one syllable each before three words:

Nunc mĕtŭentis nunc pătrŭae nunc verbĕră linguae.

In the other direction:

Ītălĭam fātō prŏfŭgus Lāvīniăquĕ vēnĭt.

This is similar to:

Pătrĭam tum prŏfŭgus vīnăquĕ cēpĭt.

---

[102] The first syllable of *advoca* should be long.

[103] An iambic trimeter, with all feet except the last lengthened to spondees.

[104] The first two and a half feet of Lucan 1.1: *Bella per Emathios plus quam civilia campos*.

[105] The last three and a half feet of Vergil’s *Aeneid* 1.1, cited in full below.

The Aristophanius arising from the heroic meter ⟨Vergil, *Aeneid* 1.1⟩:

> *Armă vĭrumquĕ cănō Troiae quī prīmŭs ăb ōrīs:*
>
> *Nunc armă vĭrumquĕ cănō <nunc> Troiae quī prīmŭs ăb ōrīs nunc.*

I have already shown that the Angelicus is the heroic meter shortened by one syllable, and that the Priapeus becomes a heroic verse if you take away one syllable.[106]

Further Reading

Pliny's *Natural History* book 2 gives a fairly mainstream cosmology (English), though his take on the gods is idiosyncratic (influenced by the Stoics and the skeptical New Academy).

Seneca's *Naturales Quaestiones* is the fullest Stoic work on natural science (English).

Ptolemy's *Tetrabiblos* is a standard work on astrology (English), though it was more influential toward the end of antiquity and in the Middle Ages than the immediately succeeding generations.

Euclid's *Elements* is the central work on geometry (English).

Aristoxenus' *Harmonics* was one of the most influential books on ancient musical theory (Greek and English).

Hephaistion's *Enchiridion on Meters and Poems* (Greek and English) is an abridged version of the most important ancient work on poetic meters (lost in its complete form).

More recent – and more accurate – translations of all of these works are available, as well as of Ptolemy's *Almagest* (astronomy) and *Harmonics* (music), but all still under copyright.

Porphyry's *Introduction to Ptolemy's Tetrabiblos* (of which there are two affordable recent translations) and his *Commentary on Ptolemy's Harmonics* (in a very expensive translation) are also commendable, the former for beginners in Hellenistic astrology, the latter more so for advanced readers in ancient musical theory.

---

[106] I.e. if one transforms its cretic in the third position into a spondee.